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# EVALUATION OF SMOKING INTERVENTIONS IN RECRUIT TRAINING

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T. A. CRONAN  
L. K. HERVIG  
T. L. CONWAY

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NAVAL HEALTH RESEARCH CENTER  
P.O. BOX 85122  
SAN DIEGO, CALIFORNIA 92138

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Evaluation of Smoking Interventions in Recruit Training<sup>1,2</sup>

Terry A. Cronan, Linda K. Hervig, & Terry L. Conway

Health Psychology Department  
Naval Health Research Center  
P. O. Box 85122  
San Diego, CA 92138-9174

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## Summary

### Problem

The Department of Defense directed all branches of the military to establish smoking prevention and cessation programs (DoD Dir 1010.10, 11 Mar NOTAL). In response to this directive the Navy developed a prototype smoking education program.

### Objective

Two objectives of this evaluation were to: (1) assess the prevalence of smoking among incoming Navy recruits, (2) determine the effects of three programs on smoking prevention and cessation during recruit training.

### Approach

Four groups of incoming recruits were compared: an education group, a no-smoking group, a health risk appraisal feedback group, and a no-treatment control group. The education intervention consisted of a one-hour presentation on the hazards of smoking and techniques for stopping. Recruits in the no-smoking company were prohibited from smoking during the eight weeks of training. Recruits assigned to the health risk appraisal group received one of two types of feedback about their behavioral risk factors. The fourth group served as a no-treatment control group. A battery of questionnaires was administered to the recruits when they entered and before they left recruit training. Smoking behavior, perceptions related to smoking, and knowledge about smoking were assessed. Smoking behavior was assessed weekly during basic training. Company commanders were interviewed at the end of recruit training to identify any factors that could have influenced smoking behavior.

### Results

Overall 24% of the entering recruits were current smokers, 16% were former smokers, and 60% had never smoked. Recruits in the education and no-smoking groups were less likely to start smoking for the first time during recruit training than recruits in the control group. There were no differences between the intervention groups and the control group in the number of former smokers who started smoking again in recruit training. The education group had fewer smokers stop smoking than the control group. Recruits received "liberty weekend" before the last week of training. During

"liberty weekend" the situational constraints of recruit training were temporarily removed and recruits could smoke as much as they wanted. To determine whether the interventions had an effect on the amount smoked by smokers, statistical analyses which controlled for the amount smoked prior to entering recruit training were performed. The outcome measure was the amount smoked after the "liberty weekend." No significant differences were found in the number of cigarettes smoked by smokers in the four groups.

Potential reasons for differences in smoking behavior involve knowledge about smoking and perceptions related to smoking. No differences in knowledge about smoking were found between the education group and the three other groups. The education group perceived its peers as more discouraging of tobacco use than did any other group. Recruits in the education and no-smoking groups perceived their company commanders and the Navy as more discouraging of tobacco use than the recruits in the health risk appraisal and control groups. Interviews conducted with participating company commanders indicated that the education and control groups received fewer opportunities to smoke than the health risk appraisal group.

### Conclusions

In summary, the education and the no-smoking programs were effective in preventing recruits who had never smoked from starting during recruit training. The education intervention was least effective in reducing the number of smokers, and none of the interventions were any more effective than the control group in getting smokers to stop smoking. Preventing recruits from starting to smoke might be attributed, in part, to the situational constraints imposed by demands of recruit training. The one-year follow-up evaluation needs to be conducted before the long-term effect of these programs on prevention and cessation of smoking can be determined.

## Evaluation of Smoking Prevention and Cessation Programs in Recruit Training

Terry A. Cronan, Linda K. Hervig and Terry L. Conway  
Naval Health Research Center

Smoking has been linked to a number of both long-term and short-term health problems (Enjeti, Hazelwood, Permutt, Menkes, and Terry, 1978; Jensen, 1986; John, 1977; Ravenholt, 1985). Besides suffering negative health consequences and decreased physical fitness (Biersner, Gunderson, & Rahe, 1972; Conway & Cronan, 1986), smokers cost employers more than nonsmokers because of higher health care needs, lost productivity, and increased absenteeism (Kristen, 1983; Weis, 1981). These costs, and the adverse health and fitness effects for the 46 percent of the males in the military who smoke (Bray, Marsden, Guess, Wheelless, Pate, Duntelman, & Iannacchione, 1986), have convinced the Department of Defense (DoD) that it should be especially concerned about smoking by military personnel.

The Department of Defense directed all branches of the service to establish smoking prevention and cessation programs (DoD Dir 1010.10, 11 Mar NOTAL). In response to this directive, the Department of the Navy provided further guidance for the development of a smoking prevention/cessation program for the Navy (SECNAVINST 5100.13). A prototype smoking education program was then developed (Navy Military Personnel Command (NMPC), 1986) for implementation in recruit training.

The Naval Health Research Center was asked to evaluate the prototype recruit smoking education program. The evaluation compared the effects of three smoking prevention/cessation programs to a no-treatment control group. The three experimental groups were the group receiving the NMPC education program, a no-smoking group, and a health risk appraisal feedback group. The no-smoking group was included because other branches of the service prohibit smoking in recruit training, and the impact of this policy on prevention and cessation has not been evaluated. It is possible that implementation of a no-smoking policy in recruit training may be the most cost-effective strategy to reduce and prevent future smoking in the Navy. The health risk appraisal group was given feedback on a number of behavioral risk factors, one of which was smoking. This group was included to assess the effects of a more general

health information approach on smoking prevention and cessation. If the health risk appraisal group was as effective in preventing and reducing smoking as the education group, it might be more cost-effective for the military to implement the health risk appraisal program because it provides additional information about good health behaviors. This report summarizes preliminary findings from the recruit training phase of this evaluation.

#### Method

##### Participants

The participants were 557 men entering the Recruit Training Command (RTC), Naval Training Center, San Diego, for Navy basic training. Upon arrival at the training command, recruits were assigned to companies of approximately 90 men each. The mean age of the participants was 18.56 (SD = 2.26). The mean number of years of education was 11.96 (SD = 1.1). Sixty-one percent were Caucasian, twenty percent were Black, eight percent were Hispanic, seven percent were from other ethnic backgrounds, and four percent did not respond to this question. The four treatment groups did not differ in their demographic characteristics (see Appendix A, Table A-1).

##### Experimental Groups

Education. Two companies were assigned to the education condition (N=162). The command fitness coordinator gave a one-hour presentation during the second week of recruit training on the hazards of smoking and techniques for stopping. The techniques for stopping which were presented included: brand fading, increasing exercise, reinforcement, and visualization. Besides following the formal outline for the presentation, the fitness coordinator told recruits that the Navy discouraged smoking because smokers cost the Navy more money. Recruits were encouraged to apply "peer pressure" to get their fellow recruits to stop smoking.

No-smoking. One company was assigned to the no-smoking condition (N=85). These recruits were told that their company was participating in a study and that their company was chosen to be a no-smoking company. Recruits in this group were prohibited from smoking during the eight weeks of recruit training. The one exception was "liberty weekend," given the weekend before graduation, for which recruits were allowed to leave the base, and no controls on smoking behavior were imposed.

Health Risk Appraisal. Two companies were assigned to receive feedback on a number of health behaviors, including smoking. Recruits in these groups filled out health risk appraisals during the first week of training. One company received feedback on health behaviors from General Health Incorporated's Health Plan Report (General Health, Inc., 1985) (N=72). The second company received feedback from the Centers for Disease Control's Health Risk Appraisal (Centers for Disease Control, 1984) (N=85). Both groups received feedback during week six of basic training. Thus, except for filling out the health risk appraisals, the health risk appraisal and control groups were treated alike until the sixth week of training.

Control. Two companies served as a no-treatment control group. These companies participated in all assessment periods; however, no special treatment or information was given to this group (N=153).

#### Measures

Background Questionnaire. The purpose of this questionnaire was to collect demographic information. Information collected included age, marital status, race, and educational levels. This questionnaire was administered at the beginning of recruit training.

Health Risk Appraisals. Both the Center for Disease Control's and General Health's health risk appraisals assessed a number of behaviors, including smoking, alcohol and caffeinated beverage consumption, drug/medication use, miles driven per year, seat belt use, and physical activity levels. A brief medical history and an assessment of stress levels were also included. These measures were administered during the first week of training.

Smoking History Questionnaire. The smoking history questionnaire was administered at the beginning of recruit training. Recruits were asked to classify themselves as nonsmokers, former smokers, or current smokers. Other smoking history items included amount currently smoked, length of time smoked, smoking topography questions, reasons for starting, and methods used in previous attempts to quit.

Smoking Status Questionnaire. This questionnaire was administered at the end of recruit training. Items were designed to assess changes in the participants' smoking behaviors and to determine the recruits' perceptions related to smoking. Recruits were asked to classify themselves as nonsmokers,

former smokers, or current smokers. In addition, amount smoked, and reasons for starting and stopping were assessed. Recruits' perceptions related to smoking were assessed by asking recruits to rate on a five-point Likert scale (ranging from definitely discourages to definitely encourages) how the Navy, company commanders, and other recruits felt about the use of tobacco products.

Weekly Assessments of Smoking Behavior. This short questionnaire was administered weekly to assess the average number of cigarettes smoked per day during the prior three days.

Knowledge about Smoking Questionnaire. Knowledge about smoking was measured at the end of basic training. This 20-item questionnaire assessed the degree of knowledge about smoking which resulted from the one-hour educational presentation about smoking. Thirteen items were constructed from materials presented in the educational presentation. The remaining seven items were constructed from the American Lung Association materials, Freedom from smoking in 20 days and A lifetime of freedom from smoking. The American Lung Association items were included so that preexisting differences in knowledge about smoking could be assessed and controlled for in comparisons among groups.

Company Commander Interviews. There were two company commanders for each participating company. All the company commanders were interviewed at the end of recruit training to identify any factors related to their behavior or to the training regulations and schedule that could have influenced the smoking behavior of participating recruits. Company commanders were asked about their usual policies regarding smoking during recruit training, the number of times each day recruits were allowed to smoke, whether these smoke breaks were used as punishment or rewards, and finally about their own smoking status.

#### Procedures

Figure 1 provides an overview of the study procedures. No data were collected during week five since recruits provided non-technical assistance to several offices at RTC. All data were collected in group settings, with one of the members of the research team reading all items and answering questions asked by the recruits.

Analysis Procedures. One-way between-subjects analyses of variance were performed to determine overall differences among the four programs for each of the outcome measures. Group comparisons were then made to test specific



hypotheses. Analyses of covariance were employed when comparisons between programs required controlling for preexisting differences (SPSS<sup>X</sup>, 1986). Fisher's Exact Test was performed to determine if there were differences between each intervention group and the control group in changes in smoking status from the beginning to the end of recruit training.

Figure 1  
OVERVIEW OF STUDY PROCEDURES

Group	Time							
	WK1	WK2	WK3	WK4	WK5	WK6	WK7	WK8
Education	I S	S	S	S		S	S	S F
No-Smoking	I S	S	S	S		S	S	S F
Health Risk Appraisal	I S	S	S	S		S H	S	S F
Control	I S	S	S	S		S	S	S F

I = Initial Test  
S = Smoking Assessment

H = Health Risk Appraisal Feedback  
F = Final Test

### Results

Results from the analyses are summarized below. Appendix A presents means, standard deviations, and statistical results for the specific contrasts.

### Smoking Prevalence

Table 1 presents the percentages of recruits who reported that they had never smoked, were former smokers, or were current smokers prior to entering recruit training. The groups differed in initial smoking status, with more smokers in the health risk appraisal group and more former smokers in the no-smoking group.

Table 1  
Smoking Status Upon Entry to Recruit Training

	(N)	Never Smoked %	Former Smoker %	Current Smoker %
<u>Overall</u>	557	60.0	16.0	24.1*
Education	162	63.6	14.8	21.6
No-smoking	85	55.3	24.7	20.0
Health Risk Appraisal	157	52.2	16.6	31.2
Control	153	66.7	11.8	21.6

\* Chi-square (6, N=557) = 14.02,  $p < .05$

#### Assessing the Effects of the Programs

To assess the effects of the programs on prevention, analyses were performed which included only recruits who classified themselves as "never smoked," or as former cigarette smokers, at the beginning of recruit training. To evaluate the effects of the interventions on cessation, only recruits who classified themselves as current smokers at the beginning of recruit training were included.

Effects on Prevention. As shown in Table 2 recruits who had never smoked in the education ( $p = .007$ ) and no-smoking ( $p = .002$ ) groups were less likely to start smoking during recruit training than were recruits in the control group. No significant differences were found between any of the experimental groups and the control group in the number of former smokers who started smoking again ( $p > .05$ ).

Table 2  
Effects of Interventions on Changes in Smoking Status

<u>Smoking Status at Entry</u>	<u>Smoker at the End of Recruit Training<sup>1</sup></u>			
	NO	YES		
	<u>N (Z)</u>	<u>N (Z)</u>	<u>FEP<sup>a</sup></u>	
Never Smoked				
Education	70 100	0 0	.007	
No-smoking	34 97.1	1 2.9	.002	
Health Risk Appraisal	55 90.2	6 9.8	.6	
Control	63 90.0	7 10.0	-	
Former Smokers				
Education	13 81.3	3 18.8	.52	
No-smoking	11 84.6	2 15.4	.46	
Health Risk Appraisal	13 68.4	6 31.6	.51	
Control	9 75.0	3 25.0	-	
Smokers				
Education	0 0	18 100	.007	
No-smoking	3 25.0	9 75.0	.28	
Health Risk Appraisal	3 11.5	23 88.5	.65	
Control	2 10.5	17 89.5	-	

<sup>1</sup> Sample distributions represent recruits participating at the end of recruit training. Some recruits did not participate at the end of training because of attrition from training, assignment to work details, or completion of checking-out procedures prior to departure from Recruit Training Command. Comparisons between study participants and non-participants at the end of recruit training were made to determine whether there was a difference in smoking status for these two groups. The results indicated that recruits who had never smoked were more likely to participate and smokers were less likely to participate at the end of recruit training [Chi-square = 8.79,  $p < .05$ ].

<sup>a</sup> FEP is an abbreviation for Fisher's Exact Probability. Changes in smoking status of each intervention group were compared to those of the control group.

Effects on Cessation. As shown in Table 2, the education group had significantly fewer smokers stop smoking ( $p = .007$ ). The last assessment of smoking was taken shortly after "liberty weekend." This was the first opportunity the recruits had to leave the military base since beginning of basic training. Thus, the no-smoking group had opportunities to smoke, and the situational constraints of recruit training were temporarily removed. An analysis of covariance was performed on the mean number of cigarettes smoked at the end of recruit training for recruits who classified themselves as smokers at the end of recruit training. The covariate was the self-reported number of cigarettes smoked at the beginning of recruit training. There were no significant differences among groups ( $p > .05$ ).

Figure 2 presents the median number of cigarettes recruits reported smoking before entering recruit training and during each weekly assessment. Because of the requirements of basic training, most recruits were absent during at least one of the weekly assessments of smoking, and these absences were not necessarily random. For this reason parametric procedures could not be employed in the analysis of these data. Instead, the amounts smoked by smokers in the education, health risk appraisal, and control groups were rank ordered. The education group, except at the first weekly assessment, consistently ranked lowest in amount smoked by smokers.

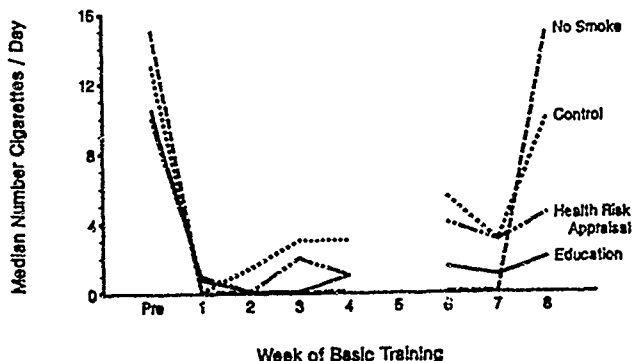


Figure 2. Median number of cigarettes smoked during recruit training.

### Explanations for the Effects

To determine potential explanations for the differences in smoking behavior, knowledge about smoking and perceptions related to smoking were examined. These results are presented below.

Knowledge about smoking. It was expected that, when preexisting differences in knowledge about smoking were controlled, recruits in the education group would score higher on the knowledge measure, since materials from thirteen of the twenty items were covered in their presentation. This hypothesis was not confirmed; the groups did not differ in their knowledge about smoking [ $F(3,553)=1.22, p > .05$ ].

Perceptions related to tobacco use. Since the education group was told to exert peer pressure to reduce smoking, it was expected that recruits in this company would perceive their peers as more discouraging of tobacco use. To test this hypothesis the education group was compared to the other three groups (see Table A-3). As expected, recruits in the education group perceived their peers as more discouraging of tobacco use than those in any other group [ $F(3,360)=6.70, p < .05$ ].

It was hypothesized that recruits in the education and no-smoking groups would perceive their company commanders and the Navy as more discouraging of tobacco use than would those in the control group. The results from these comparisons supported this hypothesis [ $F(3,359)=34.06, p < .05$  and [ $F(3,363)=8.54, p < .05$ , respectively]].

### Interviews with Company Commanders

Table 3 summarizes the tobacco use of the company commanders. Fifty-seven percent (8 of 14) of the company commanders smoked, and 14 percent (2 of 14) chewed tobacco. Of the ten who used tobacco, nine used it in the presence of their companies. When asked what the usual policy was regarding smoking during recruit training, six of the 12 (no-smoking company commanders excluded) reported that smoking was a "motivational tool." Of the same 12 company commanders, 11 said they took away smoke breaks as punishment, and eight said they gave extra smoke breaks as rewards.

Table 3  
Company Commanders' Tobacco Use

Condition	SHOKING STATUS			USED IN PRESENCE OF COMPANY		
	Non-Smoker	Smoker	Chever	No	Yes	NA
Control	2	2	0	1	1	2
No-smoking	1	0	1	0	1	1
Education	1	3	0	0	3	1
Health Risk Appraisal	0	3	1	0	4	0
Total Percent	29%	57%	14%	7%	64%	29%

The mean numbers of smoke breaks per day reported by the company commanders in the education, health risk appraisal, and control groups for each week of basic training are presented in Table 4. The health risk appraisal group had more opportunities to use tobacco than the education and control groups. Thus, some recruits may have smoked less during recruit training because the opportunities to smoke were restricted by the company commanders.

Table 4  
Average Number of Smoke Breaks Per Day

CONDITION	PRE	WK1	WK2	WK3	WK4	WK6	WK7	WK8	Overall Average
Education	.26	.29	.29	.41	.34	.79	.79	1.07	.53
Health Risk Appraisal	.63	1.13	1.13	1.05	1.07	1.00	1.38	2.13	1.19
Control	.33	.05	.12	.86	.82	.70	.82	1.43	.69

### Discussion

The education and no-smoking interventions were more effective than the health risk appraisal and control conditions in preventing recruits who had never smoked from starting to smoke. These effects do not appear to be related to knowledge about smoking, as knowledge about smoking did not differ among the groups. However, these differences in smoking behavior may be related to perceptions about smoking. Relative to recruits in the control group, recruits in the education and no-smoking groups perceived the Navy and company commanders as more discouraging of tobacco use. Also, recruits in the education group perceived their peers as more discouraging of tobacco use than did those in the control group. It is possible that information that the Navy discourages smoking, and "peer pressure" applied to smokers, paired with limiting the number of smoke breaks, is effective in altering perceptions. The altered perceptions may, in turn, help prevent recruits from starting to smoke.

The education program was least effective in getting smokers to quit; no smokers from this group quit smoking during recruit training. The no-smoking and health risk appraisal groups were no more effective in reducing the number of smokers than the control group. These findings indicate that more rigorous programs are needed to reduce the numbers of smokers in the Navy.

The behaviors and attitudes of the company commanders may also be an important influence on recruits' smoking behavior. Almost three-fourths of the company commanders used tobacco, and all but one of them did so in the presence of their companies. Many of the company commanders said that they used smoke breaks as a "motivational tool." Thus, smoking may have become highly valued by some recruits. Use of smoking as a reinforcer and the modeling of smoking behavior by the company commanders may contribute to some recruits' taking up the smoking habit and others not quitting. Thus, to discourage smoking among its members, the Navy may be well advised to teach company commanders not to use smoking as a "motivational tool." Furthermore, the Navy might prohibit company commanders from smoking in front of recruits. Educational programs for company commanders on the hazards of smoking and the effects of modeling and reinforcement may help company commanders become better role models. This would be a move toward the Navy's goal of becoming a "smoke-free" organization.

One limitation of the present study is that those in the health risk

appraisal group did not receive feedback on their health behaviors until the sixth week of basic training. Hence, this group was essentially a control group until that time. It would have been preferable if the health risk appraisal groups had received their feedback at the same time that the education groups received the smoking education program.

In summary, recruit training is a setting where sailors begin smoking but few quit. The education and no-smoking programs were most effective in preventing recruits from starting to smoke. Smokers in all groups smoked less during recruit training; however, the limited opportunities to smoke partially accounted for this effect. Future research needs to examine more closely the effects that a no-smoking policy may have on both prevention and cessation. It is possible that the combination of restricting smoking, education about the hazards of smoking, learning that the Navy discourages smoking, and being encouraged to apply peer pressure will be effective in preventing recruits from starting to smoke. More will be known about all of these effects when a one-year follow-up assessment of the smoking behavior of these participants is conducted.

It is recommended that the Navy conduct long-term follow-ups on the effects of these interventions on both prevention and cessation. It seems essential that the Navy investigate the conditions that set the stage for people to start smoking. Reducing or eliminating smoking in the Navy would save money and produce a healthier and fitter force.



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## Appendix A

**Table A-1**  
**Demographic Characteristics for the Sample**

	N <sup>a</sup>	Percentage	Chi-Square <sup>b</sup>	Sig. Level
<b><u>AGE</u></b>				
17 to 19 years	448	83.0	9.48	> .05
20 to 22 years	61	11.3		
23 and older	31	5.7		
<b><u>RACE</u></b>				
Caucasian	339	63.7	2.59	> .05
Non-Caucasian	193	36.3		
<b><u>YEARS OF EDUCATION</u></b>				
Less than high school	80	15.1	3.53	> .05
High School	377	71.0		
More than high school	74	13.9		
<b><u>MARITAL STATUS</u></b>				
Single	503	95.3	3.77 <sup>c</sup>	> .05
Not single	25	4.7		

<sup>a</sup> The N varies because of missing data.

<sup>b</sup> A chi-square test was performed to test for significant differences across the four groups on demographic characteristics.

<sup>c</sup> The expected frequency for one cell was less than 5.

Table A-2  
Recruits' Perceptions of Other Recruits  
Attitudes Toward Tobacco Use

	N	Mean	Standard Deviation	T <sup>a</sup>	Degrees of Freedom	Sig. Level
Overall	364	2.91	.90			
Education	103	2.61	.87			
No-smoking	61	2.97	.86	2.50	360	< .05
Health Risk Appraisal	102	3.16	.94	4.43	360	< .05
No-Treatment Control	98	2.92	.85	2.47	360	< .05

An analysis of variance was performed which compared the recruits' perceptions of other recruits attitudes toward tobacco use. Significant differences were found among the groups [ $F(3,360) = 6.70$ ,  $p < .05$ ].

<sup>a</sup> To test the hypothesis that the education group would perceive other recruits as more discouraging of tobacco use, T-tests were employed to compare the education group to the other three treatment groups.

Table A-3  
Recruits' Perceptions of The Company Commanders  
Attitudes Toward Tobacco Use

	N	Mean	Standard Deviation	T <sup>a</sup>	Degrees of Freedom	Sig. Level
Overall	363	2.47	.99			
Education	103	2.14	1.03	5.00	359	< .05
No-smoking	60	1.72	.87	7.28	359	< .05
Health Risk Appraisal	102	2.97	.81			
No-Treatment Control	98	2.76	.77			

An analysis of variance was performed which compared the recruits' perceptions of the company commanders attitudes toward tobacco use. Significant differences were found among the groups [ $F(3,359) = 34.06$ ,  $p < .05$ ].

<sup>a</sup> To test the hypothesis that the education and no-smoking groups would perceive the Company Commanders as more discouraging of tobacco use, T-tests were employed to compare the education group and no-smoking group to the control group.

Table A-4  
Recruits' Perceptions of The Navy's Attitudes  
Toward Tobacco Use

	N	Mean	Standard Deviation	T <sup>a</sup>	Degrees of Freedom	Sig. Level
Overall	367	1.98	.91			
Education	104	1.65	.81	4.765	363	< .05
No-smoking	62	1.89	.91	2.494	363	< .05
Health Risk Appraisal	102	2.10	.94			
No-Treatment Control	99	2.24	.87			

An analysis of variance was performed which compared the recruits' perceptions of the Navy's attitude toward tobacco use. Significant differences were found among the groups [ $F(3,363) = 8.54, p < .05$ ].

<sup>a</sup> To test the hypothesis that the education and no-smoking groups would perceive the Navy as more discouraging of tobacco use, T-tests were employed to compare the education group and no-smoking group to the control group.

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<p>The Department of Defense directed all branches of the military to establish smoking prevention and cessation programs (DoD Dir 1010.10, 11 Mar NOTAL). Smoking prevention and cessation programs were implemented and evaluated in recruit training. Four groups of incoming recruits were compared: an education group, a no-smoking group, a health risk appraisal feedback group, and no-treatment control group. Smoking behavior, perceptions related to smoking, and knowledge about smoking were assessed. Recruits in the education and no-smoking groups were less likely to start smoking during recruit training than recruits in the control group. There were no differences between the intervention groups and the control group for the number of former smokers who started smoking again. The education group had fewer smokers stop smoking than the control group. The one-year follow-up evaluation needs to be conducted before the long-term effects of these programs on prevention and cessation of smoking can be determined.</p>					
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22a NAME OF RESPONSIBLE INDIVIDUAL Terry A. Cronan			22b TELEPHONE (Include Area Code) (619) 553-8470		22c OFFICE SYMBOL

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